Connecting ThinkOrSwim to Excel

Part 1 of a 4-Part Series

You can't beat a spreadsheet for turning big chunks of data into actionable information. Without some experience in programming, however, it isn't always the easiest way to manipulate real-time data.

Let's write (*get it?*) that wrong! It <u>is</u> easy to have ThinkOrSwim (TOS) stream live data into Excel but it's not well-documented. (*There's a harder way, too, that's not well-documented. You'll get an overview of both, you crazy kids, but we'll focus on the easier.*) So, let's go through a few explanations, show you how to connect the two programs and give a couple examples to get you on your way.

Why would you want to know how to do this stuff? Because you probably have a couple of ideas or questions swimming around. If you've got imagination and take a little time to learn, you can create a real-time model in Excel that proves (*or disproves*) your hypothesis or gives you answers.

And it's fun.

On with the show!

Grab Some Coffee and Stay Awake



Let's slog through some technical explanations. I'll try to make it as painless as possible BUT if you can learn to understand the difference between a Call and Put, you're certainly able to understand the difference between DDE and RTD.

If you don't drink coffee and couldn't care less about technical details, jump to the next section and wait for us there.

DDE and RTD are two different mechanisms that allow Excel to talk with the outside world. Specifically, DDE (*Dynamic Data Exchange*) is an older technology that links Microsoft products and RTD (*Real-Time Data*) retrieves real-time data from a program that supports COM automation but there's overlap for what we're trying to do.

(I know. You're thinking, "Where can I read more about this exciting stuff?!?!" Slow down, Turbo; you can visit <u>http://msdn.microsoft.com/en-us/library/aa140061%28office.10%29.aspx</u> after reading the rest of this article.)

Which method is better? Well, as with all things technological, the answer is "it depends." (*This is when most sane people throw up their arms in exasperation with most technology people. But stick with me.*)

Both are <u>kind of</u> real-time. DDE refreshes an Excel cell when TOS updates its data; this is known as "interrupt driven." RTD is interrupt driven, too, but Excel isn't interrupted by TOS changing data; the interrupt comes from a clock timer, and the timer can be changed.

You can imagine that DDE may get updated faster than RTD because TOS data may change before the clock timer goes off. Is that bad? Not really if you consider we're talking about milliseconds.

Two more items you should know:

- 1. RTD puts less of a load on the ThinkOrSwim servers, so you can see why they want to move from DDE to RTD. (*They support both mechanisms right now*.)
- 2. DDE needs "explicit data," which means you need to give it exactly what it wants. If you want the last price of RUT in cell G2, you need to ask for the last price of RUT in cell G2. If you want the last price of SPX, you have to completely change what you ask in cell G2.

RTD can use explicit data but it can also use "implicit data." That means you can say, "Hey, G2, give me the last price for the underlying that's in cell B2." Better, you can change B2 from **RUT** to **SPX** anytime, without doing anything to cell G2, and G2 will return the last price of SPX.

Why is that good? Because Excel can make do different things with the live data that will soon be streaming into your spreadsheet. For a non-programmer, RTD is easier to use than DDE.

What's the conclusion? DDE may be technically faster but, for simplicity and user-level flexibility, RTD is the way to go. We're big easy fans so let's get moving with RTD.

One Example to Hook You for Next Week

In the previous section I talked about my old friends, cells B2 and G2, so we'll use them in our example.

Step 1: Run ThinkOrSwim. (Get it at https://mediaserver.thinkorswim.com/installer/install.html.)

- **Step 2**: After ThinkOrSwim is running, run Excel. (*We use Excel 2016 for Windows but this works in Excel 2007, too. No guarantees for any other operating system or any other spreadsheet program.*)
- <u>Step 3:</u> To keep it all straight in our head, let's create some headers. Make cells B2 and G2 in your spreadsheet look like this:

	А	В	С	D	E	F	G	н
1		Symbol					LAST	
2								

Step 4: In cell B2 (under Symbol), type RUT.

<u>Step 5:</u> Ready for the magic of RTD? Paste the following into cell G2 (*under LAST*):

=RTD("TOS.RTD",,"LAST",B2)

Feel free to type it in yourself if you don't want to copy & paste, but make sure you don't forget the 2 commas between "TOS.RTD" and "LAST"; don't forget the double quotes; LAST must be capitalized and remember to press the <Enter> key to accept the equation (*and leave cell G2*).

If you entered everything correctly, your spreadsheet should look something like this:

1	Α	В	С	D	E	F	G	Н
1		Symbol					LAST	
2		RUT					1017.223	

The number may not match because we're looking at RUT on different days and times. Other than that – CONGRATULATIONS! What you see is TOS is giving Excel live data, the last price paid for RUT.

Now change **RUT** to **SPX** in B2 to get the last price for SPX. It worked? You're a superstar!

Good enough for now. Experiment a little, then save this workbook as **LockeRTD**. Next week we'll build on top of what you did today, make Excel do more work than you, and delve into derivatives.

(By the way, if you have about 30 seconds and would like to view ThinkOrSwim's documentation on RTD, <u>click here</u>.)

Connecting ThinkOrSwim to Excel

Part 2 of a 4-Part Series

The last article covered some DDE versus RTD technobabble and left you with an example of how to use RTD in Excel to get the last price of RUT from ThinkOrSwim (TOS). Not bad for a day's work but let's take it to the next level.

Before we begin, bring up ThinkOrSwim and the **LockeRTD** Excel spreadsheet you saved last week and make sure **RUT** (not **SPX**) is in cell B2, like this:

	А	В	С	D	E	F	G	н
1		Symbol					LAST	
2		RUT					1017.223	

An Annoying Problem You May Have Encountered

If you ran ThinkOrSwim then **LockeRTD** and the last price was either blank or #N/A, you've encountered the annoying problem. (*If you have Excel 2010 or prior versions, you probably haven't seen it.*)

It's well-known and documented but still annoying, and if you search the web you'll find a wide range of work-arounds. Here's a fast and easy method we use every day:

Step 1: Open up a blank Excel spreadsheet

Step 2: Type =RTD("TOS.RTD",,"LAST","RUT") in any cell and press <Enter>

(If TOS is running, you should now see the last price of RUT.)

Step 3: Open **LockeRTD** or any other spreadsheet you have that uses RTD

That's it. Since the newly opened spreadsheet works, any successively loaded RTD spreadsheet will work. You could even close that first spreadsheet and, as long as you keep at least one RTD spreadsheet always running, load more RTD spreadsheets. (*Typically we just minimize the Step 1 spreadsheet so we can open and close others with impunity*.)

Yes, it's like last century when you had to warm up television tubes. Yes, it's annoying. No, I don't know why it hasn't yet been fixed.

But I'm sure the helpful Microsoft support staff would be more than happy to answer your question.

Behind the Curtain

This little world of connecting ThinkOrSwim to Excel has two players: ThinkOrSwim, which has the data, and Excel, which wants the data. We're using RTD as the mechanism whereby they can talk with each other. (*For the literati, think of RTD as a <u>Technobabble Fish</u>.)*

You may recall the following RTD command you entered in cell G2 from the last article:

=RTD("TOS.RTD",,"LAST",B2)

Breaking it down:

- = is how we let Excel know that what follows is something it needs to do.
- RTD is <u>an Excel function that, for our purposes, opens up communications with ThinkOrSwim.</u> RTD can act upon information sent between parenthesis in a particular order:
 - "TOS.RTD" is sent as the 1st RTD parameter. It's the quote-enclosed name of a ThinkOrSwim function that's loaded into memory when you run ThinkOrSwim. The purpose of TOS.RTD is to respond to RTD requests with data from ThinkOrSwim
 - The 2nd RTD parameter is...nothing! See those two commas next to each other in our equation? The commas separate parameters and when they're consecutive, there's obviously nothing between them so that's how we let RTD know there's no 2nd parameter.
 - 3. "LAST" is in the position of the 3rd RTD parameter. According to RTD Rules, everything sent from the 3rd parameter on is called a "<u>topic</u>," and everything from the 4th parameter on is optional.

That's nice but ThinkOrSwim always uses the 3rd and 4th parameters. "LAST" as the 3rd parameter means we're looking for the last price of...whatever we send as the 4th parameter.

4. B2 is the 4th RTD parameter. Why use B2 instead of typing "RUT"? Because we're telling Excel to use *the contents* of cell B2 as the 4th parameter. Then we can just change the contents of B2 from **RUT** to **SPX** for the last price of SPX, instead of modifying the equation and potentially goofing it up.



Here's a graphic of the conversation between the programs that may help:

From now on, all your RTD equations will look the same EXCEPT we're about to get clever with the 3rd and 4th parameters.

Let Excel Do the Work

We used B2 to implicitly reference data for the RTD equation but we still had to explicitly type "LAST". Why not replace "LAST" with another implicit data reference so we don't have to keep retyping "LAST"? And wouldn't you know it – there it is in cell G1!

	А	В	С	D	E	F	G	н
1		Symbol					LAST	
2		RUT					1017.223	

Go back into cell G2 and edit the formula, replacing "LAST" with G\$1, so it looks like this:

=RTD("TOS.RTD",,G\$1,UPPER(B2))

When you hit the <Enter> key, nothing will appear to happen but behind the scenes Excel is using the contents of cell G1, **LAST**, as the 3rd parameter. You'll see why this is important in a couple paragraphs.

<u>Did you notice</u> we're now using the UPPER function? This Excel function converts whatever we typed in B2 to uppercase. ThinkOrSwim needs to receive everything in uppercase so we're going to let Excel verify it gets sent in uppercase. This way it doesn't matter if we type **rut** or **RUT** or any combination of upper and lower case letters.

<u>Did you notice</u> that we didn't use G1 but G\$1? Excel uses the \$ to pin down the 1 so if we copy and paste cell G2 (*our equation*) into a different location, the G will change to the column we move it to but the row will always be 1.

Try it now. Copy cell G2 and paste it to cell G3, then look at the equation:

=RTD("TOS.RTD",,G\$1,UPPER(B3))

See? The G\$1 stayed the same (*because we're still in column G and we pinned row 1*) but B2 became B3. Why? Because we didn't put a \$ in front of the 2 to keep it pinned to the 2^{nd} row.

Next step: Pin B2 and B3 to column B, like this:

Cell G2 \rightarrow =RTD("TOS.RTD",,G\$1,UPPER(\$B2)) Cell G3 \rightarrow =RTD("TOS.RTD",,G\$1,UPPER(\$B3))

And, just because, enter **SPX** into cell B3 so your spreadsheet looks something like this:

	А	В	С	D	E	F	G	н
1		Symbol					LAST	
2		RUT					1014.789	
3		SPX					1908.47	
-								

What happened?

The equation in cell G2 took **LAST** from cell G1 for the 3rd parameter, looked in its row to column B and plucked RUT from B2 for the 4th parameter, then used RTD to throw all the parameters to ThinkOrSwim. ThinkOrSwim caught the request, got the last price of RUT and threw it back as the answer to the equation in cell G2.

Then cell G3 did the same thing for SPX.

Why is this good?

Because instead of manually typing the equation multiple times, you can get the last price for a BUNCH of symbols by copying cell G2 (or G3), pasting as far as you want down in column G, then simply entering a symbol in column B. You copy & paste; Excel does the heavy lifting by modifying the formulas.

Let's Get Some Option Data

We'll leave on a cliffhanger by streaming live options pricing into Excel. I'm going to use an April 2016 option but you can use any one you'd like by following these directions:

Step 1: Go to the Analyze tab in ThinkOrSwim and pick an option, any option. I'll pick the APR16 1000 RUT Put:

Monito	r Trade Analyze	Scan MarketWat	ch Charts Tools Help						Investook
+ A0	Id Simulated Trades	👯 Risk Profile 🛛 🌱	Probability Analysis 🛛 🕙 thi	nkBack 🔒 Fundamenta	als				*,≋
RUT	🔻 🚺 j F	RUSSELL 2000 INDEX	977.72763 +13.83218 B. +1.44% A	N/A MM ±6.225					
🗸 Unde	erlying								C
ς.	Last X	Net Chng	Bid X	Ask X	Size	Volume	Open	High	Low
'	977.72763	+13.83218	N/A	N/A	0 x 0	0	965.517	983.4496	965.517
 Optic 	on Chain Filter: Off	Spread: Single La	ayout: Extrinsic, Impl Vol, De	lta, Theta, Vega 🖌					
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Y AF	PR 16 (64) 100								29.07% (±96.045)
	16.9 30.93	.76023137 1.2816		0 C APR 16	9	00 19.70 C 21.20 C 2	20.45 30.932398	3014 1.2816	414 20.450
	19.6 30.40	.73593240 1.3486		0 W APR 16		10 22.00 C 23.50 C 2	22.75 30.402641	3115 1.3486	482 22.750
	22.1 29.89	.70983330 1.4123		0 C APR 16	9	20 24.60 C 26.10 C 2	25.35 29.892902	3205 1.4123	333 25.350
	24.8 29.38	.68193406 1.4714	304 72.550 71.30 C 73.8	0 C APR 16	9	30 27.50 C 29.00 C 2	28.25 29.383181	3279 1.4714	561 28.250
	27.9 28.88	.65223465 1.5243		0 C APR 16	9	40 30.60 C 32.20 C 3	31.40 28.883478	3336 1.5243	539 31.400
	31.1 28.40	.62083503 1.5695	12 58.900 58.00 C 59.8	0 C APR 16	9	50 33.90 C 35.60 C 3	34.75 28.403792	3373 1.5695	1,091 34.750
	35.2 27.92	.58783519 1.6055	421 52.950 52.10 C 53.8	0 C APR 16	9	60 37.60 C 39.20 C 3	38.40 27.924122	3388 1.6055	1,035 38.400
	39.3 27.45	.55333511 1.6308	373 47.050 46.30 C 47.8	0 C APR 16		70 41.60 C 43.20 C 4	12.40 27.454467	3378 1.6308	663 42.400
	41.35 26.99	.51773476 1.6439	57 41.350 40.60 C 42.1	0 C APR 16	9	80 45 80 0 47 70 0		3342 1 6439	287 46.750
	35.80 26.54	.48113415 1.6436	162 35.800 34.90 C 36.7	0 C	9	90 50.50 C 52.30 C 3	9.1 26.545189	3279 1.6436	SUS CHARLES EUC
	30.85 26.10	.44373325 1.6291	716 30.850 29.90 C 31.8	0 APR 16	10	00 55.40 C 57.40 C 3	4.1 26.105563	3188 1.6291	639 56.400
	26.25 25.66	.40613208 1.5997	240 26.250 25.40 C 27.1	0 0	10	10 60.80 C 62.90 C 2	9.5 25.665939	3070 1.5997	297 61 850
	22 10 25 23	3684 - 3065 1 5552	87 22 100 21 30 C 22 9	0 C APR 16					CON 167 550

<u>Step 2:</u> Hover the mouse over the Call option line and click the right mouse button. A sub-menu pops up, then you'll click on **Copy .RUT160415P1000** (*or whichever option you picked*):



Step 3: Return to Excel and click the right mouse button on the top of **SPX**. Next, click the far right icon under **Paste Options** (*aka Match Destination Formatting (M)*):



(In some older versions of Excel, it's Paste Special, Text)

When **SPX** gets overwritten, you'll see this...

	А	В
1		Symbol
2		RUT
3		.RUT160415P1000

...as cell G2 displays the last price paid for your option.

Save your LockeRTD spreadsheet because...



NEXT WEEK: Squeezing more out of ThinkOrSwim.

Orange you glad?

Connecting ThinkOrSwim to Excel

Part 3 of a 4-Part Series

Part 2 explained Excel's RTD function and how it interacted with ThinkOrSwim (TOS). Excel's UPPER function was introduced, we indirectly referenced a symbol and a ThinkOrSwim directive, and you learned a clever way to copy equations to new cells so Excel would modify just the parts you wanted modified (*pinning via the* \$). Oh, yeah, we got live option pricing fed into the spreadsheet, too.

If you thought that was a lot of fun, wait until you see what's in store for today.

(Before we begin, bring up ThinkOrSwim and the LockeRTD Excel spreadsheet you saved last week.)

ThinkOrSwim Data Export Fields

In the last article, you found that there were RTD parameters passed from Excel to ThinkOrSwim (TOS), the 3rd parameter was *something* TOS had to return and the 4th parameter was the symbol for which it was to return that *something*. (=RTD("TOS.RTD",, "LAST", "RUT"), *for example, returns the last price of RUT*.)

It should be obvious that the 4th parameter can be any symbol you can look up in ThinkOrSwim but there's much, much more than the **LAST** price that TOS can return for the 3rd parameter.

The 3rd parameter ThinkOrSwim receives is called a "Data Export Field," as in "this is the data I wish to export from ThinkOrSwim." What are the Data Export Fields? This is the only explanation I could find:

- To use RTD, bring up a watchlist on the Quotes sub-tab under the MarketWatch tab, click on the Printer icon in the top right, and choose "Export to Excel".
- Because RTD is a function in Excel, you can take full advantage of the power of Excel with functionality such as cell referencing.
- To see all of the functions supported in exported data, click on the "Data Export Help" option on the Printer menu.

https://tlc.thinkorswim.com/center/release/rel-04-26-2014.html#RTD

Ah, yes. The Printer icon. Of course. And that would be...where, exactly?



A lot changed since those words were written, including the removal of the Printer icon. Unfortunately, that's pretty much it for TOS documentation. Fortunately, you're reading this article.

Since we're already under the Quotes sub-tab under the MarketWatch tab (*MarketWatch | Quotes*), we'll start from here. You don't have to – you could start under Trade | All Products, Analyze | Add Simulated Trades, Analyze | Risk Profile, Analyze | Probability Analysis or many other locations in the software. (*It isn't in every sub-tab, though, so you may have to hunt for it.*)

Look near the top right corner and you'll see the box that's circled in the picture. Click it with the left mouse button, click **Export**, then click **Help on data export**:



For your dining and dancing pleasure, all the Data Export fields can be found at the end of this article in the <u>Bonus (?)</u> section.

Just to keep you on your toes, even though the menu says Help on Data Export,

- 1. it doesn't actually provide any help and
- 2. they aren't all Data Export fields.

More Option Data

You can find a little more about the Data Export Fields in the next section but let's use a few of them now to get additional options data. Here's how the last article left the **LockeRTD** spreadsheet:

	Α	В	С	D	E	F	G	н
1		Symbol					LAST	
2		RUT					943.80	
3		.RUT160415P1000					78.66	

Let's add in a few new column headers, like this:

	Α	В	С	D	E	F	G	Н	I	J	К	L	М	N
1		Symbol			PERCENT_CHANGE	NET_CHANGE	LAST	EXPIRATION	EXPIRATION_DAY	DELTA	GAMMA	THETA	VEGA	EXTRINSIC
2		RUT					943.69							
3		.RUT160415P1000					78.66							

Make sure your spelling is correct, everything is CAPITALIZED, and don't forget the underscore (_) in PERCENT_CHANGE, NET_CHANGE and EXPIRATION_DAY. For those familiar with Excel, select G2:G3 and paste it into E2:F3, then H2:N3. For those not familiar with Excel, follow these steps:

 Select cells G2 and G3 by clicking into cell G2 and, keeping the left mouse button pressed down, drag it into G3, then release the mouse button. →

E	F	G	н
CENT_CHANGE	NET_CHANGE	LAST	EXPIRATION
		943.12	
		78.66	

- Now we're going to copy those cells. I press the <Ctrl-c> combination on my keyboard but you can also click the right mouse button and select **Copy** from the sub-menu. Whichever you do, you'll see the G2:G3 selection highlighted by dashed lines instead of solid lines.
- 3. Go to cell E2 and click into it, then drag into E3. (*The same way you did in step 1.*) \rightarrow

E		F	G	
PERCENT_CHANGE	NET	CHANGE	LAST	EXP
			943.64	
			78.66	

4. I paste what I copied by pressing the <Ctrl-v> combination on my keyboard but you can also click the right mouse button, then select either Paste Options, Paste (*circled in red*) or Paste Options, Formula (*circled in blue*) from the sub-menu:



- 5. Go to cell H2 and click into it, then drag into N3. (*The same way you did in step 1 and step 3*.)
- 6. Paste by using <Ctrl-v> on the keyboard or the **Paste Options, Formula** (*circled in red, above*) from the sub-menu, and you'll end up with something like this:

	А	В	С	D	E	F	G	н	I	J	К	L	м	N
1		Symbol			PERCENT_CHANGE	NET_CHANGE	LAST	EXPIRATION	EXPIRATION_DAY	DELTA	GAMMA	THETA	VEGA	EXTRINSIC
2		RUT			-1.92%	-18.47	945.01	N/A	N/A	1.00	0.00	0.00	0.00	N/A
3		.RUT160415P1000			+21.50%	13.92	78.66	APR 16	2016-04-15	-0.6679	0.0034	-0.2944	1.4362	22.7099

Option-specific information (*such as* **EXPIRATION**) isn't really relevant for RUT, hence the reason you see some inapplicable information in row 2 (*which we'll clean up in the next article*), but everything in row 3 is usable and streaming live from ThinkOrSwim.

If you want to experiment with other symbols, select the entire row by clicking the 2 or 3 row number (*circled in green*), which will highlight it. Copy it (*using your favorite method*), click on an empty row number to select it (*4 is good*), and paste (*using your favorite method*).* Change the symbol in column B and away you go!

Bonus (?): Data Export Fields with Examples

There are 6 reference tables (with examples) to be found as you scroll down:

- 1. Data Export Fields returning any result for options or non-options (quantity 86)
- 2. Data Export Fields returning any result for options (quantity 85)
- 3. Data Export Fields returning any result for any underlying other than options (quantity 86)
- 4. Data Export Fields which don't return any result when used with RTD (quantity 327)
- 5. All Data Export Fields (quantity 432 but 19 are CUSTOM fields, which won't be addressed in this series of articles)
- 6. Data Export Fields of April 1, 2014 (quantity 69)

One question you may have is, "Why are there 327 Data Export Fields that don't return anything?" That's a great question. They mostly look like <u>Studies and Strategies</u> for *charting* which, for some reason, was dumped into **Help on Data Export**. If it doesn't actually export data via RTD, then why is it there? I don't know but I'm sure the helpful ThinkOrSwim support staff would be more than happy to answer your question.

One observation you may have is that a Data Export Field may return a result for an option but not return a result (*or return a bogus result*) for something not an option (*or vice versa*). Why does DIV return **N/A** for an option and DIV_FREQ return --? Shouldn't they both return *nothing* or at least return the same thing? Don't worry – we'll do some exception handling for spreadsheet modeling in the next article.

<u>Warning 1</u>: Make sure you know the format of result you're expecting! If you expect a delta to be 55.32 and the result is .5532, panic may ensue.

Before panicking or fixing problems, determine if it's real. Did it ever work and, if so, how?

<u>Warning 2</u>: Sometimes you'll get a different result during Regular Trading Hours (RTH) and After Market Close (AMC). As an example, TOS recently returned an option BID_SIZE of **127300.00%** After Market Close and a more understandable **889** during Regular Trading Hours.

<u>Warning 3</u>: It is possible Data Export Fields which don't appear to work actually do work but they're not being used the right way (*or they'll work in future revisions*). If you find any documentation, let us know!

Final Thoughts:

1. These lists were verified using ThinkOrSwim version 1880.75 during Regular Trading Hours and the results presented were captured live. Any other version of ThinkOrSwim may have a different list of Data Export Fields and/or different results (*including nothing when you expect something*) may present at any time.

- 2. CUSTOM fields were eliminated in all but table 5, the list of all Data Export Fields. (CUSTOM connects thinkscript[®] results to Excel and that's a topic for another article.)
- 3. In all tables below, the equation for the first cell returning a result is =RTD("TOS.RTD",,\$A2,B\$1). All other cells use the same formula, adjusted for their respective row and column.

TOS Data Export Field	Т	.T160318C36
52HIGH	37.12	N/A
52LOW	30.97	N/A
ASK	36.36	1.09
ASK_SIZE	50	162
ASKX	36.36 N	1.09 I
AV_TRADE_PRICE	-	-
AX	Ν	I
BA_SIZE	36 x 50	101 x 162
BACK_EX_MOVE	±1.003	N/A
BACK_VOL	20.97%	N/A
BETA	0.3085	N/A
Beta	0.3085	N/A
BID	36.35	1.07
BID_SIZE	36	101
BIDX	36.35 N	1.07 N
BX	Ν	Ν
CALL_VOLUME_INDEX	0.402	N/A
CLOSE	36.65	1.31
COVERED_RETURN	N/A	19.03%
DELTA	1	0.5529
DESCRIPTION	AT&T INC COM	T 100 MAR 16 36 CALL
DIV	0.48	N/A
DIV_FREQ	Q	
EPS	0.9485	N/A
EX_DIV_DATE	1/6/16	N/A
EX_MOVE_DIFF	±0.782	N/A
EXCHANGE	COMPOSITE	COMPOSITE
EXPIRATION	N/A	MAR 16
EXPIRATION_DAY	N/A	2016-03-19
EXTRINSIC	N/A	0.72
FRONT_EX_MOVE	±0.627	N/A
FRONT_VOL	24.22%	N/A
FX_PAIR	Т	.T160318C36
GAMMA	0	0.1882
HIGH	36.74	1.13
HTB_ETB	ETB	

Data Export Fields returning any result for options or non-options (quantity 86)

IMPL_VOL	21.41%	18.80%
INTRINSIC	N/A	0.36
LAST	36.36	1.08
LAST_SIZE	900	1
LASTX	36.36 D	1.08 N
LOW	36.26	1.08
LX	D	Ν
MARK	36.36	1.08
MARK_CHANGE	-0.29	-0.235
MARK_PERCENT_CHANGE	-0.79%	-17.87%
MARK_PERCENT_UNDERLYING	100.00%	2.97%
MARKET_CAP	223,687 M	N/A
MAX_COVERED_RETURN	N/A	19.03%
MRKT_MKR_MOVE	±0.373	N/A
MT_NEWS	*	*
NET_CHANGE	-0.29	-0.23
OPEN	36.65	1.13
OPEN_INT	0	24666
OPTION_VOLUME_INDEX	0.614	N/A
P_L_DAY	-	-
P_L_OPEN	-	-
P_L_PERCENT	-	-
P_L_YTD	-	-
PE	38.34	N/A
PERCENT_CHANGE	-0.79%	-17.56%
PERCENT_IN_THE_COLUMN	N/A	1.00%
PERCENT_OUT_THE_MONEY	N/A	0.00%
POSITION_N_L	-	-
POSITION_QTY	-	-
PROB_OF_EXPIRING	N/A	52.06%
PROB_OF_TOUCHING	N/A	88.52%
PROB OTM	N/A	47.94%
PUT_CALL_RATIO	2.095	N/A
PUT_VOLUME_INDEX	0.821	N/A
QUOTE_TREND	instrument=T	instrument=.T160318C36
RHO	0	0.0171
ROC	N/A	N/A
ROR	N/A	N/A
SHARES	6152000000	N/A
STOCK_BETA	0.3085	N/A
STRENGTH_METER	Range Bound	N/A
STRIKE	N/A	36
SYMBOL	Т	.T160318C36
ТНЕТА	0	-0.0091
VEGA	0	0.0459

VOL_DIFF	3.25%	N/A
VOL_INDEX	21.41%	N/A
VOLUME	11636907	88
WEIGHTED_BACK_VOL	19.46%	N/A
YIELD	5.28%	N/A

Data Export Fields returning any result for options (quantity 85 but less than 50 are useful)

TOS Data Export Field	.T160318C36	
52HIGH	N/A	
52LOW	N/A	
ASK	1.11	
ASK_SIZE	379	
ASKX	1.11 X	
AV_TRADE_PRICE	-	
AX	Х	
BA_SIZE	442 x 379	
BACK_EX_MOVE	N/A	
BACK_VOL	N/A	
BETA	N/A	
Beta	N/A	
BID	1.08	
BID_SIZE	442	
BIDX	1.08 M	
BX	M	
CALL_VOLUME_INDEX	N/A	
CLOSE	1.31	
COVERED_RETURN	18.89%	
DELTA	0.5568	
DESCRIPTION	T 100 MAR 16 36 CALL	
DIV	N/A	
DIV_FREQ		
EPS	N/A	
EX_DIV_DATE	N/A	
EX_MOVE_DIFF	N/A	
EXCHANGE	COMPOSITE	
EXPIRATION	MAR 16	
EXPIRATION_DAY	2016-03-19	
EXTRINSIC	0.715	
FRONT_EX_MOVE	N/A	
FRONT_VOL	N/A	
FX_PAIR	.T160318C36	
GAMMA	0.1889	
HIGH	1.13	
IMPL_VOL	18.72%	

INTRINSIC	0.38
LAST	1.11
LAST_SIZE	8
LASTX	1.11 C
LOW	1.09
LX	С
MARK	1.095
MARK_CHANGE	-0.22
MARK_PERCENT_CHANGE	-16.73%
MARK_PERCENT_UNDERLYING	3.01%
MARKET_CAP	N/A
MAX_COVERED_RETURN	18.89%
MRKT_MKR_MOVE	N/A
MT_NEWS	*
NET_CHANGE	-0.2
OPEN	1.13
OPEN_INT	24666
OPTION_VOLUME_INDEX	N/A
P_L_DAY	-
P_L_OPEN	-
P_L_PERCENT	-
P_L_YTD	-
PE	N/A
PERCENT_CHANGE	-15.27%
PERCENT_IN_THE_COLUMN	1.06%
PERCENT_OUT_THE_MONEY	0.00%
POSITION_N_L	-
POSITION_QTY	-
PROB_OF_EXPIRING	52.45%
PROB_OF_TOUCHING	87.83%
PROB_OTM	47.55%
PUT_CALL_RATIO	N/A
PUT_VOLUME_INDEX	N/A
QUOTE_TREND	instrument=.T160318C36
RHO	0.0172
ROC	N/A
ROR	N/A
SHARES	N/A
STOCK_BETA	N/A
STRENGTH_METER	N/A
STRIKE	36
SYMBOL	.T160318C36
THETA	-0.009
VEGA	0.0458
VOL_DIFF	N/A

VOL_INDEX	N/A
VOLUME	84
WEIGHTED_BACK_VOL	N/A
YIELD	N/A

Data Export Fields returning any result for any underlying other than options (quantity 86)

TOS Data Export Field	Т
52HIGH	37.12
52LOW	30.97
ASK	36.4
ASK_SIZE	86
ASKX	36.40 N
AV_TRADE_PRICE	-
AX	Ν
BA_SIZE	26 x 86
BACK_EX_MOVE	±1.007
BACK_VOL	21.03%
ВЕТА	0.3085
Beta	0.3085
BID	36.39
BID_SIZE	26
BIDX	36.39 N
BX	N
CALL_VOLUME_INDEX	0.394
CLOSE	36.65
COVERED_RETURN	N/A
DELTA	1
DESCRIPTION	AT&T INC COM
DIV	0.48
DIV_FREQ	Q
EPS	0.9485
EX_DIV_DATE	1/6/16
EX_MOVE_DIFF	±0.781
EXCHANGE	COMPOSITE
EXPIRATION	N/A
EXPIRATION_DAY	N/A
EXTRINSIC	N/A
FRONT_EX_MOVE	±0.635
FRONT_VOL	24.48%
FX_PAIR	Т
GAMMA	0
HIGH	36.74
HTB_ETB	ETB
IMPL_VOL	21.48%

INTRINSIC	N/A
LAST	36.39
LAST_SIZE	100
LASTX	36.39 Y
LOW	36.26
LX	Y
MARK	36.39
MARK_CHANGE	-0.26
MARK_PERCENT_CHANGE	-0.71%
MARK_PERCENT_UNDERLYING	100.00%
MARKET_CAP	223,871 M
MAX_COVERED_RETURN	N/A
MRKT_MKR_MOVE	±0.387
MT_NEWS	*
NET_CHANGE	-0.26
OPEN	36.65
OPEN_INT	0
OPTION_VOLUME_INDEX	0.613
P_L_DAY	-
P_L_OPEN	-
P_L_PERCENT	-
P_L_YTD	-
PE	38.37
PERCENT_CHANGE	-0.71%
PERCENT_IN_THE_COLUMN	N/A
PERCENT_OUT_THE_MONEY	N/A
POSITION_N_L	-
POSITION_QTY	-
PROB_OF_EXPIRING	N/A
PROB_OF_TOUCHING	N/A
PROB_OTM	N/A
PUT_CALL_RATIO	2.15
PUT_VOLUME_INDEX	0.827
QUOTE_TREND	instrument=T
RHO	0
ROC	N/A
ROR	N/A
SHARES	6152000000
STOCK_BETA	0.3085
STRENGTH_METER	Range Bound
STRIKE	N/A
SYMBOL	Т
THETA	0
VEGA	0
VOL_DIFF	3.45%

VOL_INDEX	21.48%
VOLUME	11344564
WEIGHTED_BACK_VOL	19.42%
YIELD	5.28%

Data Export Fields which don't return any result when used with RTD (quantity 327)

ACT_WARNING	IntradayMomentumIndex	RelativeVolatilityIndex
ADX	InvertedHammer	RelativeVolumeStDev
ADXCrossover	KeltnerChannels	ReverseEngineeringMACD
ADXR	Kicking	ReverseEngineeringRSI
ATR	KlingerHistogram	RibbonStudy
ATRTrailingStop	KlingerOscillator	RisingThreeMethods
AbandonedBaby	LBR_PaintBars	STARCBands
AccDist	LBR_SmartADX	SVEPivots
AccelerationBands	LBR_ThreeTenOscillator	SVEZLRBPercB
AccelerationDecelerationOsc	LegacyEMA	SectorRotationModel
AccumDistBuyPr	LinearRegCh100	SemiCupFormation
AccumDistPrVol	LinearRegCh50	SentimentZoneOscillator
AccumulationSwingIndex	LinearRegChVar	SeparatingLines
AdvanceBlock	LinearRegCurve	SeriesCount
AdvanceDecline	LinearRegTrendline	ShootingStar
AdvanceDeclineCumulativeAvg	LinearRegrReversal	SideBySideWhiteLines
Alpha2	LinearRegressionSlope	SimpleMovingAvg
AlphaJensen	LongHaulFilter	Spearman
AroonIndicator	LongLeggedDoji	SpectrumBars
AroonOscillator	LookUpHighest	Spreads
AwesomeOscillator	LookUpLowest	StandardDevChannel
BalanceOfMarketPower	LowPriceGappingPlay	StandardDeviation
BeltHold	MACD	StandardError
Beta2	MACDHistogram	StandardErrorBands
BollingerBands	MACDHistogramCrossover	StandardErrorChannel
BollingerBandsCrossover	MACDTwoLines	StickSandwich
BollingerBandwidth	MACDWithPrices	StochRSI
BollingerPercentB	MESASineWave	StochasticCrossover
Breakaway	MajorGannLevels	StochasticFast
CCI	MarkerIndicator	StochasticFull
CCIAverage	MarketForecast	StochasticMomentumIndex
CSI	Marubozu	StochasticSlow
CamarillaPoints	MassIndex	StressIndicator
ChaikinMoneyFlow	MatHold	SwamiAccDist
ChaikinOsc	MatchingLow	SwamiConvolution
ChaikinOscillator	McClellanOscillator	SwamiIntradayFisher
ChaikinVolatility	McClellanSummationIndex	SwamiIntradayImpulse
ChandeMomentumOscillator	MedianAverage	SwamiIntradayVolume

CloseLocationValue	MedianPrice	SwamiLaguerreTrend
ConcealingBabySwallow	MeetingLines	SwamiMarketMode
Correlation	MktFacilitationIdx	SwamiPredict
CumulativeVolumeIndex	Momentum	SwamiRelativePerformance
CyberCyclesOscillator	MomentumCrossover	SwamiSwingWave
DEMA	MomentumPercent	SwamiVolatility
DIMinus	MomentumSMA	SwamiVolume
DIPlus	MoneyFlow	SwingIndex
DMA	MoneyFlowIndex	SymbolRelation
DMI	MoneyFlowIndexCrossover	TAC_ADX
DMI_Oscillator	MonkeyBars	TAC_DIMinus
DMI_ReversalAlerts	MorningDojiStar	TAC_DIPlus
DMI_StochasticExtreme	MorningStar	TEMA
DailyHighLow	MovAvgAdaptive	TMV
DailyOpen	MovAvgEnvelope	TPOProfile
DailySMA	MovAvgExpRibbon	TRIX
DarkCloudCover	MovAvgExponential	TTM_LRC
DarvasBox	MovAvgTriangular	TTM_Squeeze
Deliberation	MovAvgTwoLines	TTM_Trend
DemandIndex	MovAvgWeighted	TTM_Wave
DetrendedPriceOsc	MovingAvgCrossover	TheoreticalOptionPrice
DisparityIndex	MultiCurrencyCorrelationOsc	ThreeBlackCrows
DisplacedEMA	NegativeVolumeIndex	ThreeInsideDown
Displacer	Next3rdFriday	ThreeInsideUp
Doji	OnBalanceVolume	ThreeLineStrike
DoubleSmoothedStochastics	OnNeck	ThreeOutsideDown
DownsideGapThreeMethods	OnsetTrendDetector	ThreeOutsideUp
Downside Tasuki Gap	OpenInterest	ThreeStarsInTheSouth
DynamicMomentumIndex	OptionDelta	ThreeWhiteSoldiers
EaseOfMovement	OptionGamma	Thrusting
EhlersDistantCoefficientFilter	OptionRho	TimeSeriesForecast
EhlersRoofingFilter	OptionTheta	TradeVolumeIndex
EhlersStochastic	OptionVega	TrendNoiseBalance
EhlersSuperSmootherFilter	PPS	TrendPeriods
ElliotOscillator	PairCorrelation	TrendQuality
Engulfing	PairRatio	TriStar
ErgodicOsc	ParabolicSAR	TrueRangeIndicator
Ermanometry	ParabolicSARCrossover	TrueRangeSpecifiedVolume
EveningDojiStar	PercentChg	TrueStrengthIndex
EveningStar	PercentR	TwoCrows
FAKE_THINKSCRIPT_COLUMN	PersonsPivots	TypicalPrice
FW_CCI_Advanced	PiercingLine	UlcerIndex
FW_CCI_Basic	PolarizedFractalEfficiency	UltimateOscillator
FW_DPO_MOBO	PolychromMtm	UniqueThreeRiverBottom
FW_MMG	PositiveVolumeIndex	UniversalOscillator

FW_SOAPPriceAndVolumeTrendUpsideGapTwoCrowsFallingThreeMethodsPriceAverageCrossoverUpsideTasukiGapFastBetaPriceChannelVWAPFisherTransformPriceOscVariableMAForceIndexPriceRatioVerticalHorizontalFilterForecastOscillatorPriceVolumeRankVolatilityStdDev	FW_MOBO_Basic	PriceActionIndicator	UpsideGapThreeMethods
FallingThreeMethodsPriceAverageCrossoverUpsideTasukiGapFastBetaPriceChannelVWAPFisherTransformPriceOscVariableMAForceIndexPriceRatioVerticalHorizontalFilterForecastOscillatorPriceVolumeRankVolatilityStdDev	FW_SOAP	PriceAndVolumeTrend	UpsideGapTwoCrows
FastBetaPriceChannelVWAPFisherTransformPriceOscVariableMAForceIndexPriceRatioVerticalHorizontalFilterForecastOscillatorPriceVolumeRankVolatilityStdDev	FallingThreeMethods	PriceAverageCrossover	Upside Tasuki Gap
FisherTransformPriceOscVariableMAForceIndexPriceRatioVerticalHorizontalFilterForecastOscillatorPriceVolumeRankVolatilityStdDev	FastBeta	PriceChannel	VWAP
ForceIndexPriceRatioVerticalHorizontalFilterForecastOscillatorPriceVolumeRankVolatilityStdDev	FisherTransform	PriceOsc	VariableMA
ForecastOscillator PriceVolumeRank VolatilityStdDev	ForceIndex	PriceRatio	VerticalHorizontalFilter
	ForecastOscillator	PriceVolumeRank	VolatilityStdDev
FreedomOfMovement PriceZoneOscillator VolatilitySwitch	FreedomOfMovement	PriceZoneOscillator	VolatilitySwitch
GatorOscillator ProjectionBands VolumeAccumulation	GatorOscillator	ProjectionBands	VolumeAccumulation
HACOLT ProjectionOscillator VolumeAvg	HACOLT	ProjectionOscillator	VolumeAvg
Hammer QStick VolumeFlowIndicator	Hammer	QStick	VolumeFlowIndicator
HangingMan RSI VolumeOsc	HangingMan	RSI	VolumeOsc
Harami RSICrossover VolumeProfile	Harami	RSICrossover	VolumeProfile
HaramiCross RSquared VolumeRateOfChange	HaramiCross	RSquared	VolumeRateOfChange
HeikinAshiDiff RainbowAverage VolumeWeightedMACD	HeikinAshiDiff	RainbowAverage	VolumeWeightedMACD
HighPriceGappingPlay RandomWalkIndex VolumeZoneOscillator	HighPriceGappingPlay	RandomWalkIndex	VolumeZoneOscillator
HistoricalVolatility RangeBands VortexIndicator	HistoricalVolatility	RangeBands	VortexIndicator
HomingPigeon RangeIndicator WeaknessInAStrongTrend	HomingPigeon	RangeIndicator	WeaknessInAStrongTrend
HullMovingAvg RateOfChange WeightedClose	HullMovingAvg	RateOfChange	WeightedClose
IFT_StochOsc RateOfChangeCrossover WildersSmoothing	IFT_StochOsc	RateOfChangeCrossover	WildersSmoothing
Ichimoku Ray WilliamsAD	Ichimoku	Ray	WilliamsAD
IdenticalThreeCrows RayBearPower WilliamsAlligator	IdenticalThreeCrows	RayBearPower	WilliamsAlligator
ImpVolatility RayBullPower WilliamsPercentR	ImpVolatility	RayBullPower	WilliamsPercentR
Impulse RelativeMomentumIndex WoodiesPivots	Impulse	RelativeMomentumIndex	WoodiesPivots
InNeck RelativeRangeIndex ZigZagTrendPercent	InNeck	RelativeRangeIndex	ZigZagTrendPercent
Inertia RelativeStrength ZigZagTrendSign	Inertia	RelativeStrength	ZigZagTrendSign

All Data Export Fields (quantity 432)

TOS Data Export Field	Т	.T160318C36
52HIGH	37.12	N/A
52LOW	30.97	N/A
ACT_WARNING		
ADX		
ADXCrossover		
ADXR		
ASK	36.43	1.16
ASKX	36.43 N	1.16 C
ASK_SIZE	42	2427
ATR		
ATRTrailingStop		
AV_TRADE_PRICE	-	-
AX	N	С
AbandonedBaby		
AccDist		

AccelerationBands		
AccelerationDecelerationOsc		
AccumDistBuyPr		
AccumDistPrVol		
AccumulationSwingIndex		
AdvanceBlock		
AdvanceDecline		
AdvanceDeclineCumulativeAvg		
Alpha2		
AlphaJensen		
AroonIndicator		
AroonOscillator		
AwesomeOscillator		
BACK_EX_MOVE	±1.02	N/A
BACK_VOL	21.27%	N/A
BA SIZE	59 x 42	467 x 2,427
BETA	0.3085	N/A
BID	36.42	1.11
BIDX	36.42 N	1.11 C
BID SIZE	59	467
BX	Ν	С
BalanceOfMarketPower		
BeltHold		
Beta	0.3085	N/A
Beta2		
BollingerBands		
BollingerBandsCrossover		
BollingerBandwidth		
BollingerPercentB		
Breakaway		
CALL VOLUME INDEX	0.451	N/A
CCIAverage		
CLOSE	36.65	1.31
COVERED RETURN	N/A	18.74%
CSI		
CUSTOM1		
CUSTOM10		
CUSTOM11		
CUSTOM12		
CUSTOM13		
CUSTOM14		
CUSTOM15		
CUSTOM16		
CUSTOM17		

CUSTOM18		
CUSTOM19		
CUSTOM2		
CUSTOM3		
CUSTOM4		
CUSTOM5		
CUSTOM6		
CUSTOM7		
CUSTOM8		
CUSTOM9		
CamarillaPoints		
ChaikinMoneyFlow		
ChaikinOsc		
ChaikinOscillator		
ChaikinVolatility		
ChandeMomentumOscillator		
CloseLocationValue		
ConcealingBabySwallow		
Correlation		
CumulativeVolumeIndex		
CyberCyclesOscillator		
DELTA	1	0.5649
DEMA		
DLIVIA		
DESCRIPTION	AT&T INC COM	T 100 MAR 16 36 CALL
DESCRIPTION	AT&T INC COM	T 100 MAR 16 36 CALL
DESCRIPTION DIMinus DIPlus	AT&T INC COM	T 100 MAR 16 36 CALL
DESCRIPTION DIMinus DIPlus DIV	AT&T INC COM	T 100 MAR 16 36 CALL
DESCRIPTION DIMinus DIPlus DIV DIV_FREQ	AT&T INC COM 0.48 Q	T 100 MAR 16 36 CALL N/A
DESCRIPTION DIMinus DIPlus DIV DIV_FREQ DMA	AT&T INC COM	T 100 MAR 16 36 CALL N/A
DESCRIPTION DIMinus DIPlus DIV DIV_FREQ DMA DMI	AT&T INC COM 0.48 Q	T 100 MAR 16 36 CALL N/A
DESCRIPTION DIMinus DIPlus DIV DIV_FREQ DMA DMI DMI_Oscillator	AT&T INC COM	T 100 MAR 16 36 CALL N/A
DELMA DESCRIPTION DIMinus DIPlus DIV DIV_FREQ DMA DMI DMI_Oscillator DMI_ReversalAlerts	AT&T INC COM 0.48 Q	T 100 MAR 16 36 CALL N/A
DEMA DESCRIPTION DIMinus DIPlus DIV DIV_FREQ DMA DMI DMI_Oscillator DMI_ReversalAlerts DMI_StochasticExtreme	AT&T INC COM	T 100 MAR 16 36 CALL
DELMA DESCRIPTION DIMinus DIPlus DIV DIV_FREQ DMA DMI DMI_Oscillator DMI_ReversalAlerts DMI_StochasticExtreme DailyHighLow	AT&T INC COM	T 100 MAR 16 36 CALL
DERMA DESCRIPTION DIMinus DIPlus DIV DIV_FREQ DMA DMI DMI_Oscillator DMI_ReversalAlerts DMI_ReversalAlerts DMI_StochasticExtreme DailyHighLow DailyOpen	AT&T INC COM	T 100 MAR 16 36 CALL
DELMA DESCRIPTION DIMinus DIPlus DIV DIV_FREQ DMA DMI DMI_Oscillator DMI_ReversalAlerts DMI_ReversalAlerts DMI_StochasticExtreme DailyHighLow DailyOpen DailySMA	AT&T INC COM	T 100 MAR 16 36 CALL
DELMA DESCRIPTION DIMinus DIPlus DIV DIV_FREQ DMA DMI DMI_Oscillator DMI_Oscillator DMI_ReversalAlerts DMI_StochasticExtreme DailyHighLow DailyOpen DailySMA DarkCloudCover	AT&T INC COM	T 100 MAR 16 36 CALL N/A
DELWA DESCRIPTION DIMinus DIPlus DIV DIV_FREQ DMA DMI DMI_Oscillator DMI_Oscillator DMI_ReversalAlerts DMI_StochasticExtreme DailyHighLow DailyOpen DailyOpen DailySMA DarkCloudCover DarvasBox	AT&T INC COM	T 100 MAR 16 36 CALL
DELWA DESCRIPTION DIMinus DIPlus DIV DIV_FREQ DMA DMI DMI_Oscillator DMI_Oscillator DMI_ReversalAlerts DMI_ReversalAlerts DMI_StochasticExtreme DailyHighLow DailyOpen DailyOpen DailySMA DarkCloudCover DarvasBox Deliberation	AT&T INC COM	T 100 MAR 16 36 CALL N/A
DELWA DESCRIPTION DIMinus DIPlus DIV DIV_FREQ DMA DMI DMI_Oscillator DMI_Oscillator DMI_ReversalAlerts DMI_ReversalAlerts DMI_StochasticExtreme DailyHighLow DailyOpen DailyOpen DailyOpen DailySMA DarkCloudCover DarvasBox Deliberation DemandIndex	AT&T INC COM	T 100 MAR 16 36 CALL N/A
DELWA DESCRIPTION DIMinus DIPlus DIV DIV_FREQ DMA DMI DMI_Oscillator DMI_Oscillator DMI_ReversalAlerts DMI_StochasticExtreme DailyHighLow DailyOpen DailyOpen DailySMA DarkCloudCover DarvasBox Deliberation DemandIndex DetrendedPriceOsc	AT&T INC COM	T 100 MAR 16 36 CALL N/A
DELWA DESCRIPTION DIMinus DIPlus DIV DIV_FREQ DMA DMI DMI_Oscillator DMI_Oscillator DMI_ReversalAlerts DMI_StochasticExtreme DailyHighLow DailyOpen DailyOpen DailyOpen DailySMA DarkCloudCover DarvasBox Deliberation DemandIndex DetrendedPriceOsc DisparityIndex	AT&T INC COM	T 100 MAR 16 36 CALL
DELMA DESCRIPTION DIMinus DIPlus DIV DIV_FREQ DMA DMI DMI_Oscillator DMI_Oscillator DMI_ReversalAlerts DMI_ReversalAlerts DMI_StochasticExtreme DailyHighLow DailyOpen DailyOpen DailyOpen DailySMA DarkCloudCover DarvasBox Deliberation DemandIndex DetrendedPriceOsc DisparityIndex DisplacedEMA	AT&T INC COM	T 100 MAR 16 36 CALL N/A
DELMADESCRIPTIONDIMinusDIPlusDIVDIV_FREQDMADMIDMI_OscillatorDMI_ReversalAlertsDMI_StochasticExtremeDailyHighLowDailyOpenDailySMADarkCloudCoverDarvasBoxDeliberationDemandIndexDetrendedPriceOscDisplacedEMADisplacer	AT&T INC COM	T 100 MAR 16 36 CALL N/A

DoubleSmoothedStochastics		
DownsideGapThreeMethods		
Downside Tasuki Gap		
DynamicMomentumIndex		
EPS	0.9485	N/A
EXCHANGE	COMPOSITE	COMPOSITE
EXPIRATION	N/A	MAR 16
EXPIRATION_DAY	N/A	2016-03-19
EXTRINSIC	N/A	0.71
EX_DIV_DATE	1/6/16	N/A
EX_MOVE_DIFF	±0.794	N/A
EaseOfMovement		
EhlersDistantCoefficientFilter		
EhlersRoofingFilter		
EhlersStochastic		
EhlersSuperSmootherFilter		
ElliotOscillator		
Engulfing		
ErgodicOsc		
Ermanometry		
EveningDojiStar		
EveningStar		
FAKE_THINKSCRIPT_COLUMN		
FRONT_EX_MOVE	±0.64	N/A
FRONT_VOL	24.59%	N/A
FW_CCI_Advanced		
FW_CCI_Basic		
FW_DPO_MOBO		
FW_MMG		
FW_MOBO_Basic		
FW_SOAP		
FX_PAIR	Т	.T160318C36
FallingThreeMethods		
FastBeta		
FisherTransform		
ForceIndex		
ForecastOscillator		
FreedomOfMovement		
GAMMA	0	0.187
GatorOscillator		
HACOLT		
HIGH	36.74	1.13
HTB_ETB	ETB	
Hammer		
HangingMan		

Harami		
HaramiCross		
HeikinAshiDiff		
HighPriceGappingPlay		
Historical Volatility		
HomingPigeon		
HullMovingAvg		
IFT_StochOsc		
IMPL_VOL	21.56%	18.87%
INTRINSIC	N/A	0.425
Ichimoku		
Identical Three Crows		
ImpVolatility		
Impulse		
InNeck		
Inertia		
IntradayMomentumIndex		
InvertedHammer		
KeltnerChannels		
Kicking		
KlingerHistogram		
KlingerOscillator		
LAST	36.425	1.13
LASTX	36.425 D	1.13 M
LAST_SIZE	100	3
LBR_PaintBars		
LBR_SmartADX		
LBR_ThreeTenOscillator		
LOW	36.26	1.09
LX	D	М
LegacyEMA		
LinearRegCh100		
LinearRegCh50		
LinearRegChVar		
LinearRegCurve		
LinearRegTrendline		
LinearRegrReversal		
LinearRegressionSlope		
LongHaulFilter		
LongLeggedDoji		
LookUpHighest		
LookUpLowest		
LowPriceGappingPlay		
MACD		
MACDHistogram		

MACDHistogramCrossover		
MACDTwoLines		
MACDWithPrices		
MARK	36.425	1.135
MARKET_CAP	224,087 M	N/A
MARK_CHANGE	-0.225	-0.18
MARK_PERCENT_CHANGE	-0.61%	-13.69%
MARK_PERCENT_UNDERLYING	100.00%	3.12%
MAX_COVERED_RETURN	N/A	18.74%
MESASineWave		
MRKT_MKR_MOVE	±0.382	N/A
MT_NEWS	*	*
MajorGannLevels		
MarkerIndicator		
MarketForecast		
Marubozu		
MassIndex		
MatHold		
MatchingLow		
McClellanOscillator		
McClellanSummationIndex		
MedianAverage		
MedianPrice		
MeetingLines		
MktFacilitationIdx		
Momentum		
MomentumCrossover		
MomentumPercent		
MomentumSMA		
MoneyFlow		
MoneyFlowIndex		
MoneyFlowIndexCrossover		
MonkeyBars		
MorningDojiStar		
MorningStar		
MovAvgAdaptive		
MovAvgEnvelope		
MovAvgExpRibbon		
MovAvgExponential		
MovAvgTriangular		
MovAvgTwoLines		
MovAvgWeighted		
MovingAvgCrossover		
MultiCurrencyCorrelationOsc		
NET_CHANGE	-0.225	-0.18

NegativeVolumeIndex		
Next3rdFriday		
OPEN	36.65	1.13
OPEN_INT	0	24666
OPTION_VOLUME_INDEX	0.473	N/A
OnBalanceVolume		
OnNeck		
OnsetTrendDetector		
OpenInterest		
OptionDelta		
OptionGamma		
OptionRho		
OptionTheta		
OptionVega		
PE	38.4	N/A
PERCENT CHANGE	-0.61%	-13.74%
PERCENT IN THE COLUMN	N/A	1.18%
PERCENT OUT THE MONEY	N/A	0.00%
POSITION N L	-	-
POSITION QTY	-	-
PPS		
PROB OF EXPIRING	N/A	53.22%
PROB OF TOUCHING	N/A	86.48%
PROB OTM	N/A	46.78%
PUT CALL RATIO	1.124	N/A
PUT VOLUME INDEX	0.495	N/A
P L DAY	-	-
P L OPEN	-	-
P_L_PERCENT	-	-
P_L_YTD	-	-
PairCorrelation		
PairRatio		
ParabolicSAR		
ParabolicSARCrossover		
PercentChg		
PercentR		
PersonsPivots		
PiercingLine		
PolarizedFractalEfficiency		
PolychromMtm		
PositiveVolumeIndex		
PriceActionIndicator		
PriceAndVolumeTrend		
PriceAverageCrossover		
PriceChannel		

PriceOsc		
PriceRatio		
PriceVolumeRank		
PriceZoneOscillator		
ProjectionBands		
ProjectionOscillator		
QStick		
QUOTE_TREND	instrument=T	instrument=.T160318C36
RHO	0	0.0173
ROC	N/A	N/A
ROR	N/A	N/A
RSI		
RSICrossover		
RSquared		
RainbowAverage		
RandomWalkIndex		
RangeBands		
RangeIndicator		
RateOfChange		
RateOfChangeCrossover		
Ray		
RayBearPower		
RayBullPower		
RelativeMomentumIndex		
RelativeRangeIndex		
RelativeStrength		
RelativeVolatilityIndex		
RelativeVolumeStDev		
ReverseEngineeringMACD		
ReverseEngineeringRSI		
RibbonStudy		
RisingThreeMethods		
SHARES	6152000000	N/A
STARCBands		
STOCK_BETA	0.3085	N/A
STRENGTH_METER	Range Bound	N/A
STRIKE	N/A	36
SVEPivots		
SVEZLRBPercB		
SYMBOL	Т	.T160318C36
SectorRotationModel		
SemiCupFormation		
SentimentZoneOscillator		
SeparatingLines		
SeriesCount		

ShootingStar		
SideBySideWhiteLines		
SimpleMovingAvg		
Spearman		
SpectrumBars		
Spreads		
StandardDevChannel		
StandardDeviation		
StandardError		
StandardErrorBands		
StandardErrorChannel		
StickSandwich		
StochRSI		
StochasticCrossover		
StochasticFast		
StochasticFull		
StochasticMomentumIndex		
StochasticSlow		
StressIndicator		
SwamiAccDist		
SwamiConvolution		
SwamiIntradayFisher		
SwamiIntradayImpulse		
SwamiIntradayVolume		
SwamiLaguerreTrend		
SwamiMarketMode		
SwamiPredict		
SwamiRelativePerformance		
SwamiSwingWave		
SwamiVolatility		
SwamiVolume		
SwingIndex		
SymbolRelation		
TAC_ADX		
TAC_DIMinus		
TAC_DIPlus		
ТЕМА		
ТНЕТА	0	-0.009
TMV		
TPOProfile		
TRIX		
TTM_LRC		
TTM_Squeeze		
TTM_Trend		
TTM_Wave		

TheoreticalOptionPrice		
ThreeBlackCrows		
ThreeInsideDown		
ThreeInsideUp		
ThreeLineStrike		
ThreeOutsideDown		
ThreeOutsideUp		
ThreeStarsInTheSouth		
ThreeWhiteSoldiers		
Thrusting		
TimeSeriesForecast		
TradeVolumeIndex		
TrendNoiseBalance		
TrendPeriods		
TrendQuality		
TriStar		
TrueRangeIndicator		
TrueRangeSpecifiedVolume		
TrueStrengthIndex		
TwoCrows		
TypicalPrice		
UlcerIndex		
UltimateOscillator		
UniqueThreeRiverBottom		
Universal Oscillator		
UpsideGapThreeMethods		
UpsideGapTwoCrows		
UpsideTasukiGap		
VEGA	0	0.0458
VOLUME	10171530	76
VOL_DIFF	3.32%	N/A
VOL_INDEX	21.56%	N/A
VWAP		
VariableMA		
VerticalHorizontalFilter		
VolatilityStdDev		
VolatilitySwitch		
VolumeAccumulation		
VolumeAvg		
VolumeFlowIndicator		
VolumeOsc		
VolumeProfile		
VolumeRateOfChange		
VolumeWeightedMACD		
VolumeZoneOscillator		

VortexIndicator		
WEIGHTED_BACK_VOL	19.72%	N/A
WeaknessInAStrongTrend		
WeightedClose		
WildersSmoothing		
WilliamsAD		
WilliamsAlligator		
WilliamsPercentR		
WoodiesPivots		
YIELD	5.27%	N/A
ZigZagTrendPercent		
ZigZagTrendSign		

Data Export Fields on April 1, 2014 (qty 69)

TOS Export Field	Т	.T160318C36
52HIGH	36.82	N/A
52LOW	30.97	N/A
ASK	36.87	1.43
ASKX	36.87 N	1.43 X
ASK_SIZE	308	247
AX	N	х
BACK_EX_MOVE	±0.863	N/A
BACK_VOL	20.16%	N/A
BA_SIZE	177 x 308	139 x 247
BETA	0.3085	N/A
BID	36.86	1.39
BIDX	36.86 N	1.39 I
BID_SIZE	177	139
BX	N	1
CALL_VOLUME_INDEX	0.959	N/A
CLOSE	36.53	1.12
COVERED_RETURN	N/A	12.56%
DELTA	1	0.6404
DESCRIPTION	AT&T INC COM	T 100 MAR 16 36 CALL
DIV	0.48	N/A
DIV_DATE		
DIV_FREQ	Q	
DT		
EPS	0.9485	N/A
EXCHANGE	COMPOSITE	COMPOSITE
EXPIRATION	N/A	MAR 16
EXTRINSIC	N/A	0.545
EX_MOVE_DIFF	±0.45	N/A
FRONT_EX_MOVE	±0.737	N/A
FRONT_VOL	55.97%	N/A
GAMMA	0	0.1768
HIGH	37.04	1.5

HTB_ETB	ETB	
IMPL_VOL	19.74%	18.30%
INTRINSIC	N/A	0.865
LAST	36.865	1.38
LASTX	36.865 N	1.38 Q
LAST_SIZE	100	4
LOW	36.53	1.25
LX	N	Q
MARK	36.865	1.41
MARKET_CAP	226,793 M	N/A
MAX_COVERED_RETURN	N/A	12.56%
MRKT_MKR_MOVE	±0.722	N/A
MT_NEWS	*	*
NET_CHANGE	0.335	0.26
OPEN	36.59	1.25
OPEN_INT	0	24606
OPTION_VOLUME_INDEX	1.119	N/A
PE	38.87	N/A
PERCENT_CHANGE	+0.92%	+23.21%
PROB_OF_EXPIRING	N/A	60.20%
PROB_OF_TOUCHING	N/A	73.66%
PUT_CALL_RATIO	1.276	N/A
PUT_VOLUME_INDEX	1.288	N/A
RHO	0	0.0207
ROC	N/A	N/A
ROR	N/A	N/A
SHARES	6152000000	N/A
STRENGTH_METER	Range Bound	N/A
STRIKE	N/A	36
SYMBOL	Т	.T160318C36
ТНЕТА	0	-0.0075
VEGA	0	0.0465
VOLUME	32228662	209
VOL_DIFF	35.81%	N/A
VOL_INDEX	19.74%	N/A
YIELD	5.21%	N/A

* For those that have read this far, thank you. Did you notice how clever it was to modify the RTD equation the way we did in Part 2 so we could simply copy & paste it all over the place in Part 3?

/insert pat on the back/

Connecting ThinkOrSwim to Excel

Part 4 - Finale

If you go back to Part 1, the very first sentence you read was:

You can't beat a spreadsheet for turning big chunks of data into actionable information.

Over the course of this article, we've reviewed different mechanisms which allow ThinkOrSwim to communicate with Excel, written equations that use RTD, learned a bit about how to manipulate data with Excel, and uncovered a raft (*maybe even a boatload*) of live and streaming information we could be getting in Excel via ThinkOrSwim.

So, really, the goal of "Connecting ThinkOrSwim to Excel" was accomplished in Part 3. Well done! Pats on the back all around!

In this series conclusion, we're going to clean up the **LockeRTD** spreadsheet, then turn a chunk of live, streaming ThinkOrSwim data into actionable information.

(Before we begin, bring up ThinkOrSwim and the LockeRTD Excel spreadsheet you saved last week.)

Clean-Up

Except for the updated values, here's how we last left **LockeRTD**:

	А	В	С	D	E	F	G	н	I	J	К	L	м	N
1		Symbol			PERCENT_CHANGE	NET_CHANGE	LAST	EXPIRATION	EXPIRATION_DAY	DELTA	GAMMA	THETA	VEGA	EXTRINSIC
2		RUT			+1.59%	15.29	979.19	N/A	N/A	1.00	0.00	0.00	0.00	N/A
3		.RUT160415P1000			-12.43%	-8.52	60.00	APR 16	2016-04-15	-0.55	0.00	-0.32	1.63	34.74

It's ok but check out all the inapplicable option information for RUT in row 2. If we're going to simply copy & paste the formulas, letting Excel do all the heavy lifting, let's put a little intelligence into the equation so it only displays options data if the symbol entered in column B is actually an option.

Yes, it's faster and easier to make it look good by simply deleting the equations from H2 to N2 but that reduces flexibility. What does that mean? It means you couldn't just add a symbol into column B, willy-nilly, and let Excel do the work. You'd have to copy the equations in columns H through N only when you enter an option in column B, then delete them when you change the symbol from an option to a stock.

Ugh. Too much work. So let's think like a contortionist and insert some flexibility into this act.

Pop Quiz: What's the big difference in the symbol that separates options from everything else?

If you said, "the dot at the first position of the symbol," good thinking! That means if there's a dot in the leftmost position, we want the option data and if there's not a dot in the leftmost position, we don't want RTD to do anything.

The first offender is cell H2, so let's change the equation in H2 from this:

=RTD("TOS.RTD",,H\$1,UPPER(\$B2))

To this:

=IF(LEFT(\$B2,1) = ".", RTD("TOS.RTD",,H\$1,UPPER(\$B2)), "")

The new part of the equation is in red, so you can see what was added.

Breaking it down:

- IF is a logical function that will return the first value if the condition is true and the second value if the condition is false. Since it's a function, like RTD or UPPER, notice that what follows the parameters is enclosed in parenthesis.
- LEFT(\$B2,1) is the LEFT function. The LEFT function returns some number of leftmost characters from the beginning of some text. In this case, we want LEFT to return 1 character starting at the leftmost character of the contents in cell B2. (Remember, we used \$B to "pin" the column to B.)
- IF(LEFT(\$B2,1) = ".", is the LEFT function inside the IF function. What it means is we want to look at the leftmost 1 character in cell B2 (*it's the R from RUT*) and if it's a dot (.), then do what follows the 1st comma OTHERWISE do what follows the 2nd comma.
 - 1. What follows the 1st comma is the RTD equation we've been using. You already know how it works but, if you don't remember, <u>go back to Part 2</u>.
 - 2. What follows the 2nd comma is "". Those two double straight quotes (*not curly "smart quotes" because, of course, they're different ASCII characters*) next to each other are interpreted as "nothing do nothing at all."

<u>Bottom Line</u>: The equation can be translated to "If the first character in cell B2 is a dot, it must be an option so go get its EXPIRATION from ThinkOrSwim...otherwise, do nothing."

	А	В	С	D	E	F	G	н	I	J	К	L	м	N
1		Symbol			PERCENT_CHANGE	NET_CHANGE	LAST	EXPIRATION	EXPIRATION_DAY	DELTA	GAMMA	THETA	VEGA	EXTRINSIC
2		RUT			+1.47%	14.16	978.05		N/A	1.00	0.00	0.00	0.00	N/A
з		.RUT160415P1000			-12.43%	-8.52	60.00	APR 16	2016-04-15	-0.5551	0.0037	-0.3188	1.6303	34.3523
4														

After you modify the equation in H2 and press <Enter>, you should see:

H2 is blank, which is exactly what we wanted. Copy & paste H2 over H2 through N3 (*following the instructions in Part 3*) and you'll see:

	Α	В	С	D	E	F	G	н	I	J	К	L	м	N
1		Symbol			PERCENT_CHANGE	NET_CHANGE	LAST	EXPIRATION	EXPIRATION_DAY	DELTA	GAMMA	THETA	VEGA	EXTRINSIC
2		RUT			+1.47%	14.21	978.11							
з		.RUT160415P1000			-12.43%	-8.52	60.00	APR 16	2016-04-15	-0.5549	0.0037	-0.3189	1.6305	34.4081

Much easier to read!

Now copy row 3 to rows 4 and 5 (*revisit <u>Part 3</u>, <u>More Option Data</u> if you don't remember how*) for the next step.

Working with Complex Options

Let's build a Butterfly!

I'm already using a RUT APRIL 1000 Put so we'll add a 950 as the center and a 900 as the lower leg. I could certainly return to TOS to copy & paste the option code into column B but, since the symbol for 1000 is already there, it's easier to simply edit B4 and change the 1000 to 950, then change the 1000 to 900 in B5:

	А	В	С	D	E	F	G	н	I	J	к	L	м	N
1		Symbol			PERCENT_CHANGE	NET_CHANGE	LAST	EXPIRATION	EXPIRATION_DAY	DELTA	GAMMA	THETA	VEGA	EXTRINSIC
2		RUT			+1.49%	14.40	978.29							
3		.RUT160415P1000			-12.43%	-8.52	60.00	APR 16	2016-04-15	-0.5543	0.0037	-0.3190	1.6312	34.2405
4		.RUT160415P950			-8.25%	-3.13	34.81	APR 16	2016-04-15	-0.3773	0.0032	-0.3363	1.5679	34.6500
5		.RUT160415P900			-17.42%	-4.25	20.15	APR 16	2016-04-15	-0.2379	0.0024	-0.2994	1.2768	20.4000

Add column headers and quantities so column C and D looks like this:

	Α	В	С	D	E	F	G	н	I	J	K	L	м	N
1		Symbol	Qty	TotDelta	PERCENT_CHANGE	NET_CHANGE	LAST	EXPIRATION	EXPIRATION_DAY	DELTA	GAMMA	THETA	VEGA	EXTRINSIC
2		RUT			+1.57%	15.09	978.99							
3		.RUT160415P1000	1		-12.43%	-8.52	60.00	APR 16	2016-04-15	-0.5516	0.0037	-0.3198	1.6338	34.7402
4		.RUT160415P950	-2		-8.25%	-3.13	34.81	APR 16	2016-04-15	-0.3751	0.0032	-0.3367	1.5663	34.4000
5		.RUT160415P900	1		-17.42%	-4.25	20.15	APR 16	2016-04-15	-0.2368	0.0024	-0.2998	1.2744	20.3000

Enter this equation in cell D2 to find the total deltas for the quantity of individual options:

=IF(AND(LEFT(\$B2,1)=".",C2<>0),C2*J2*10, "")

Hey! That's similar to what we did in H2 to N5, isn't it? Let's break it down:

- The AND function will result in TRUE if all the parameters passed to it are true. In this case:
 - LEFT(\$B2,1)= "." will return TRUE if the first character of the symbol (*column B*) is a dot (*in other words, column B is an option*)
 - C2<>0 will return TRUE if there's a number other than 0 in column C (*we named that column Qty*)
 - If you follow this logic, the AND function will return FALSE in row 2 because RUT isn't an option and, incidentally, there isn't a quantity in column C. It will, however, return TRUE for the next 3 rows because they're options and there is some number other than 0 for quantity.
- C2*J2*10 multiplies the quantity times the option delta, for the total number of deltas ThinkOrSwim is holding for that option, then multiplies the result by 10 so deltas are consistent with our other option modeling tools (*like OptionVue or ONE*).
- "" is, of course, nothing (as in, "do nothing if it isn't an option")

The equation can be translated to, "If there's an option in column B of this row, and there's some quantity, multiply the quantity times the current delta supplied by ThinkOrSwim times 10 (*qty*delta*10*) ...otherwise, do nothing."

Copy cell D2 into cells D3, D4 and D5. Your spreadsheet should look like this:

	Α	В	С	D	E	F	G	н	I	J	K	L	м	N
1		Symbol	Qty	TotDelta	PERCENT_CHANGE	NET_CHANGE	LAST	EXPIRATION	EXPIRATION_DAY	DELTA	GAMMA	THETA	VEGA	EXTRINSIC
2		RUT			+1.56%	15.08	978.98							
3		.RUT160415P1000	1	-5.52	-12.43%	-8.52	60.00	APR 16	2016-04-15	-0.5520	0.0037	-0.3188	1.6336	34.7265
4		.RUT160415P950	-2	7.50	-8.25%	-3.13	34.81	APR 16	2016-04-15	-0.3751	0.0032	-0.3360	1.5661	34.2500
5		.RUT160415P900	1	-2.37	-17.42%	-4.25	20.15	APR 16	2016-04-15	-0.2367	0.0024	-0.2995	1.2741	20.2000

Let's add the total number of deltas ThinkOrSwim has for the Butterfly by placing this equation into D6:

=SUM(D2:D5)

Add a top border to the cell to make it look nice (go to Excel's Home | Font and look for Border):

	Α	В	С	D	E	F	G	Н	I	J	K	L	М	N
1		Symbol	Qty	TotDelta	PERCENT_CHANGE	NET_CHANGE	LAST	EXPIRATION	EXPIRATION_DAY	DELTA	GAMMA	THETA	VEGA	EXTRINSIC
2		RUT			+1.57%	15.09	978.99							
з		.RUT160415P1000	1	-5.52	-12.43%	-8.52	60.00	APR 16	2016-04-15	-0.5521	0.0037	-0.3183	1.6336	34.7360
4		.RUT160415P950	-2	7.50	-8.25%	-3.13	34.81	APR 16	2016-04-15	-0.3749	0.0032	-0.3354	1.5659	34.2500
5		.RUT160415P900	1	-2.36	-17.42%	-4.25	20.15	APR 16	2016-04-15	-0.2363	0.0024	-0.2986	1.2729	20.2000
6				-0.39										

Now it's easy to see the current price for RUT and how it's changed since the previous trading day. Ditto for all our Butterfly options, plus other interesting stuff (like the greeks), including the total deltas our Butterfly is holding (*according to ThinkOrSwim*).

Conclusion

Many trades in the Locke In Your Success programs depend on taking action based on the greeks, like when delta is too much or ratios exceed their proscribed limit. You can use the powerful tools within Excel (*like conditionally formatting the delta sum to be red if it's over 100*) to alert you when the ThinkOrSwim greeks are telling you it's time to look at adjusting.

The example here was simple, summing Butterfly deltas, but imagine the possibilities:

- Compare synthetic pricing for verticals
- Choose which of many covered writes best fits your goals
- Decide which pattern of adjustments most keep your greeks under control
- Summarize and track multiple existing trades all on one screen

In general, you can quickly summarize a mountain of live, streaming data so you're able to prove or disprove theories, and move faster while making better decisions. The possibilities are limited only by your imagination.

You've started down the trail of how to turn big chunks of data into actionable information. Enjoy your journey!

(If you'd like, you can download the completed **LockeRTD** Excel file from <u>www.LockeInYourSuccess.com</u>. It has everything you did plus a little more.)